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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/039,309	11/07/2001	Eiji Sato	45672/56,682	2127
21874	7590	11/22/2005	EXAMINER	
EDWARDS & ANGELL, LLP			MONDT, JOHANNES P	
P.O. BOX 55874			ART UNIT	
BOSTON, MA 02205			PAPER NUMBER	
			3663	

DATE MAILED: 11/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/039,309

Applicant(s)

SATO ET AL.

Examiner

Johannes P. Mondt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,4-9,11 and 12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1 and 4-9 is/are allowed.
- 6) ☒ Claim(s) 11 and 12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

After-Final Response filed 11/02/05 forms the basis for this office action. In light of the Remarks made by Applicant and a review of the grounds for rejection the Final Office Action mailed 9/12/05 is herewith withdrawn and replaced with the following office action. Since Arguments by Applicant as made in said Remarks are only persuasive for claim 1 and claims 4-9 dependent thereon (see "Response to Arguments") while claims 11 and 12 had been newly added in the Amendment filed 6/21/05 in response to the Non-Final Action mailed 4/1/05 this office action is a Final Office Action.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. ***Claim 11*** is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki et al (JP 10-333121) (IDS item BC), in view of Yamamoto et al (5,696,568).

*Miyazaki et al teach* a liquid crystal display device (title) comprising:

a liquid crystal layer 12;

a pair of substrates 1 and 7 provided so as to interpose the liquid crystal layer therebetween; and

a plurality of pixels (pixels in areas 11) arranged in a matrix pattern (Figure B),

wherein:

the liquid crystal layer has a helical structure and exhibits at least two stable states including a planar state (inherently the initial state before applying any electric field is stable and exists) and a focal conic state (inherently, for sufficiently high voltage a focal conic state is reached, said focal conic state being defined as a polydomain state with a substantial random orientation of the helical axis of the liquid crystal molecules) according to an applied voltage; and

in each of the plurality of pixels, a thickness  $d$  of the liquid crystal layer has at least two values (see Figure A, and paragraphs [0015] and [0016]), and, consequently, the liquid crystal layer has at least two regions having different values of a first threshold voltage for transitioning the liquid crystal layer from the planar state to the focal conic state (this is inherent in the variable thickness because the transition is due to the existence of a local critical electric field while electric field is directly proportional to the ratio of voltage divided by distance)

*Miyazaki et al* do not necessarily teach the limitation that said thickness changes continuously. However, it would have been obvious to include said limitation in view of Yamamoto et al, who, in a patent on a liquid crystal display (title), hence analogous art, teach a continuous change of the thickness of liquid crystal layer 1 (col. 2, l. 37) through a profile characterized by a gradual ramp with taper angle preferably less than 15 degrees (col. 3, l. 10-25 and col. 6, l. 18-20 with reference to Figure 1), as opposed to the step-wise profile by Miyazaki et al, said step-wise profile being referred to as Prior Art in Yamamoto et al (col. 2, l. 45-64 and Fig. 6A) in so as to prevent unwanted discontinuity in the orientation of the liquid crystal molecules and thereby prevent the

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disadvantage of a residual image (col. 2, l. 46-63). *Motivation* to include the teaching by Yamamoto et al in the invention by Miyazaki et al derives at least from the prevention of residual image in any display when applied to a time sequence of images.

2. **Claims 11 and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki et al (loc.cit.) in view of Ikeno et al (6,008,875).

*Miyazaki et al teach* a liquid crystal display device (title) comprising:

a liquid crystal layer 12;

a pair of substrates 1 and 7 provided so as to interpose the liquid crystal layer therebetween; and

a plurality of pixels (pixels in areas 11) arranged in a matrix pattern (Figure B),

wherein:

the liquid crystal layer has a helical structure and exhibits at least two stable states including a planar state (inherently the initial state before applying any electric field is stable and exists) and a focal conic state (inherently, for sufficiently high voltage a focal conic state is reached, said focal conic state being defined as a polydomain state with a substantial random orientation of the helical axis of the liquid crystal molecules) according to an applied voltage; and

in each of the plurality of pixels, a thickness  $d$  of the liquid crystal layer has at least two values (see Figure A, and paragraphs [0015] and [0016]), and, consequently, the liquid crystal layer has at least two regions having different values of a first threshold voltage for transitioning the liquid crystal layer from the planar state to the focal conic state (this is inherent in the variable thickness

because the transition is due to the existence of a local critical electric field while electric field is directly proportional to the ratio of voltage divided by distance)

*Miyazaki et al do not necessarily teach* the limitation that said thickness changes continuously such that one of the pair of substrates has a continuous wavy shape on a liquid crystal layer side. However, it would have been obvious to include said limitation in view of Ikeno et al, who, in a patent on a liquid crystal display (with  $d/P > 2$  expressly included), hence analogous art, (N.B.: with  $d/P > 2$  expressly included, see col. 4, l. 20-22) teach the thickness of the liquid crystal display to vary continuously (thus meeting *claim 11*) in a wavy shape (thus meeting *claim 12*) (Fig. 4) so as to improve gray scale display (col. 4, l. 36-52). *Motivation* to include the teaching by Ikeno et al in the invention by Miyazaki et al thus at least derives from the improvement of the gray scale display (col. 4, l. 50-52).

### ***Allowable Subject Matter***

#### ***1. Claims 1 and 4-9 are allowed.***

The following is a statement of reasons for the indication of allowable subject matter: closest prior art found to date is Miyazaki et al as cited; however, the definitions of  $V_{th1}$  and  $V_{th2}$  in Miyazaki et al are inadequate for an identification with the first and second threshold voltages recited in claim 1. No other art has been found over which claim 1 can be rejected as being either anticipated or obvious. Related art is van den Berk (4,536,059); however, no relation between the equivalent of  $V_{thF}$ , i.e.,  $E_{th}$ , and the equivalent of  $V_{thH}$ , i.e.,  $E_2$  as recited in claim 1 is either taught or obvious in view of any other art found to date.

### ***Response to Arguments***

Applicant's arguments, see Remarks in After-Final Amendment, filed 11/2/2005, with respect to claims 1 and 4-9 have been fully considered and are persuasive: the threshold voltages  $V_{th1}$  and  $V_{th2}$  as defined by Miyazaki et al do not correspond with the first and second threshold voltages in claim 1. The rejections of claims 1 and 4-9 have been withdrawn. However, said Remarks are not persuasive with regard to claims 11 and 12: counter to Applicant's argument that "Similarly with respect to claims 11 and 12, nor can the Ikeno reference make up for the deficiencies of the Miyazaki reference and the Handbook reference suggests that Applicant overlooks the completely independent nature of claim 11 (while claim 12 is dependent on claim 11) and does in no way involve said threshold voltages. Therefore, Applicant has not presented any valid arguments and the rejection, after review, must be made to stand.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the



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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P. Mondt whose telephone number is 571-272-1919. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM  
November 14, 2005

  
JACK KEITH  
SUPERVISORY PATENT EXAMINER